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14. ABSTRACT Background: Advances in health information technology (HIT) and the use of evidence-based, clinical decision support (CDS) tools in electronic health records (EHR) hold great promise, but are relatively untested for nurses. Knowledge-Based Nursing (KBN; Lang, Hook, Akre, et al., 2006) content and evidence-based clinical decision support (CDS) tools were embedded into the EHR of one large health care system. Since then, the organization (along with many others around the country) moved quickly to utilize government incentives to purchase, design, and deploy a new comprehensive EHR to achieve effective care and meaningful use. The KBN-based content and decision-support tools were built into the system nursing policies and the new EHR. Training focused on the technical functions with passive dissemination of the evidence-based content. With the new system fully implemented, formal program evaluation will be conducted to measure the implementation of evidence-based processes and evaluate the impact of these processes on patient care outcomes. Objective/Hypotheses: The Dissemination of Evidence-based Policy Framework (Dodson, Brownson, & Weiss, 2012) guided this study. The framework proposes that dissemination strategies affects the implementation and maintenance of evidence-based policy and ultimately impacts patient outcomes. Hypothesis 1: The embedding of KBN- content into policy and EHR-based clinical decision-support (passive dissemination) has a positive effect on the adoption and implementation of evidence-based practices and the achievement of nurse-sensitive patient outcomes. Hypothesis 2: Active dissemination (optimization training) strategies with nurse leaders and staff will improve the implementation of evidence-based practices and produce measurable improvements in nursing sensitive outcomes compared to policy and EHR build (passive dissemination) alone. Study Design: This six-phase study is being conducted with staff nurses and nurse leaders employed on medical/surgical and critical care units of a quaternary medical center where evidence-based content and decision-support tools were built into system policy and the EHR. The KBN Logic Model guided the development of nurse and patient surveys, audits/reports, and non-participant observation methods used to gather detailed information about context, care processes and outcomes for each nursing unit in response to passive EBP dissemination strategies at baseline. Baseline findings will be used to identify gaps in knowledge and practice behaviors and design optimization training. A clustered randomized clinical trial design will be used to deploy optimization training using passive (control) or active (treatment) dissemination strategies for nurse leaders and nursing staff and examine the impact on implementation and outcomes. The KBN Research Team has been interaction with a Federal Military Advisory Committee to review and provide input/feedback on the study and identify ways to disseminate findings and applications for the military.					
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INTRODUCTION:

The purpose of this pre/post- cluster randomized clinical research study is to learn more about the effectiveness of varied implementation strategies on the adoption of evidence-based practices (EBP) by acute care nurses during usual patient care. This study is based on two conceptual frameworks: 1) Knowledge-based Nursing that describes how evidence can be embedded into policy and the electronic health record (EHR) to support nurse decision-making and improve care outcomes and 2) Dissemination of Evidence-based Policy that describes that dissemination processes (passive vs. active) can impact the adoption, implementation, and maintenance of EBP and impact outcomes. The Research Team developed patient and nurse surveys, electronic audit processes, and non-participant observation methods to gather detailed information about context, knowledge, care processes and outcomes for each nursing unit in response to passive (electronic and policy-based) EBP dissemination strategies at baseline. The baseline assessment will describe current outcomes and identify gaps in knowledge and use of evidence-based practice behaviors by staff nurse and nurse leaders. The baseline findings will inform the content and design of optimization training that will maintain passive dissemination for nurses who work on the “control” units and transition to active dissemination strategies on the treatment units to achieve improved outcomes over passive strategies alone.

BODY:

Overview

The “Impact Study” is proceeding with goal accomplishment as planned. It was known going into this work that most of the measures needed for the study – did not exist at the start. The project plan allotted time for reviewing the literature, identifying concepts/definitions and completing measure development. Our TATRC advisors encouraged us to get an early start on human subjects review but realistically this could not take place until all the measures were ready. The time was well spent – with conceptual frameworks and measures in place. When final human subject approvals is received – we are ready to proceed immediately – slightly behind original plan but able to make up time with intervention planning already in progress.

Personnel and Project Administration

- February: Aurora Health Care required the completion of a legal review and the creation of financial cost center before the project could start.
- The KBN Research office was set up with equipment & dedicated secure file management system
- Created job descriptions, posted, & marketed for two positions: Project Manager & Graduate Intern
- Initiated contact with the Aurora Research Administration Contract Office to prepare formal contracts with two consultants named in the proposal
- Aurora Strategic Planning department provided an interim Project Manager to set up project plan
- Initiated the Project: Kick Off Meeting March 2013
Project Kickoff with on-boarding of Research Team include Researchers (Hook, Gentile, & Singh) and Informatics Staff (obtained new research credentials and CITI Training)
- Interviewed, hired, and on-boarded Project Manager – June 2013

- Interviewed, hired, and on-boarded Graduate Intern – June 2013; Hired as permanent Researcher Dec-2013
- Collaborated with Dr. Beth Devine to complete the essential knowledge review and begin to draft the knowledge test questions for nurse/nurse leaders (Consultant work completed with 4 additional hours of effort above budget)
- Recruited, hired and on-boarded two Clinical Nurse Specialist (CNS) advisors to support communication and subject recruitment – Nov 2013
- Consultant Dr. Dawn Dowding transitioned her faculty position to Columbia University. Our research support department has had some delays in finalizing the consulting contract that are expected to be rectified soon (and allow her to contribute effort/consultation in Year 2).
- In planning for conducting baseline assessment, it was determined that the nonparticipant observations could be conducted more efficiently if we had an additional informatics nurse; Rose Giannini effort/hours was adjusted; A staff member (15% - Ketchum) was on-boarded in December.

Travel/Conference Attendance

- PI attended the Midwest Nursing Research Society Conference-Chicago to recruit an intern (Mar-2013); Participated in preconference session on Implementation Research (not funded by Grant)
- PI and Graduate Student Intern attended the AMIA (Informatics) Conference in November in Washington DC with added participation in the preconference workshop on patient engagement.
- Federal Military Advisory Council Leaders/Members could not identify an appropriate site for the Research Team to visit – Travel was deferred

Federal Military Study Advisory Council

- Established a collaborative relationship with LTC Michael Ludwig, RN-BC, MS, CPHIMS, AMEDD Chief Nursing Information Officer, Ollie B. Gray RN, MSN, PMP Executive Healthcare Manager, AITG for TATRC and members of the Federal Nursing Informatics iEHR Collaborative
- Held an orientation meeting with LTC Ludwig and associates – March 2013
- Worked with LTC Michael Ludwig to set-up kick-off /orientation meeting with DOD Nursing Information iEHR Collaborative Meeting – 5/28/2013
- Worked with LTC Michael Ludwig to plan subsequent meetings (July 31 2013) with plan to draft a **Council Charter (see Appendix F)**
- F/u call (August 30 2013) with Federal Military Advisory Committee. Identified that each branch was taking different paths/approaches to evidence based practice. Discussed need for determining how similar or different Aurora St. Luke's Medical Center (study site) was in relation to military facilities. Group crafted an **Assessment Form (Appendix G)** for completion by each branch to help us to identify similarities and differences in how evidence-based practice and nursing protocols are embedded into patient care in each of the quad entities (VA, Navy, Army, Air Force) and in Aurora.
- The Assessment form was refined and distributed with key questions to capture processes as mentioned above at the Sept 2013 meeting. Work in progress to network with each quad entity and set-up meeting to discuss feedback from assessment framework.
- Navy Branch Meeting held on Oct 23 2013, led by Captain Joel Parker to discuss the KBN research project to attendees and request input from Navy Nurses. The Navy representatives discussed where they were in building their documentation system with best practices and associated protocols, etc. for cross military/cross discipline use. Consensus was achieved around the need for strategies to ensure adoption and evaluation re: informatics build to ensure that it was working and supporting the staff to effectively achieve outcomes. The call ended with shared interest but uncertainty re: next steps. Assessment form completion was requested.

- December check-in conference call was held (Dec 13, 2013) with Federal Advisory Council with some attendance. To date, however, none of the branch stakeholders have completed the Assessment Tool for gathering information about the nursing structure and where they are with doing evidence-based practice projects supported by informatics. We have scheduled another check-in call the week of 1/20/2014.

Human Subject Protocol Preparation and Approval

- Protocol was submitted to Aurora IRB on 30-SEPT-2013, deferred pending military pre-review
- Pre-reviewed by Brigit Ciccarello, M.A. Regulatory Compliance Specialist, Telemedicine & Advanced Technology Research Center (TATRC) Research Program Officer (The Geneva Foundation) U.S. Army Medical Research & Materiel Command (USAMRMC, Ft. Detrick, MD) with feedback 30-OCT-2013
- Revised protocol return to Compliance Specialist with additional information and approved for submission 26-NOV-2013
- Submitted for Aurora IRB Review with approval for study application and protocol – 20-DEC-2013
- Aurora IRB contacted for additional waivers (as requested in the protocol) - Approval Letter with all requested waivers – 03 – JAN-2014
- Submitted AHC IRB Approved documents for review by DOD Human Research Protection Office (HRP office – 07 – JAN – 2014. Protocol assigned for review to Ms. Pat Shank (24 – JAN-2014) .

Statement of Work: Major Project Goal Accomplishment

Goal #1: Identify essential knowledge and nursing practice behaviors (components)

STATUS: Completed Milestone in collaboration with Consultant. 29-JUN-2013

- The KBN Research Team reviewed and systematically analyzed the evidence-based practice synthesis documents to identify essential knowledge & practice behaviors for six phenomena:
 - Acute Pain
 - Medication Non-adherence
 - Depressive Symptoms/Suicide
 - Risk for Falls/Fall-related Injury/Post Fall Management
 - Pressure Ulcer Risk/Actual
 - Delirium Risk/Actual-all Venues (ICU and Med-Surg)
- The KBN Research Team held a series of iterative process meetings to define parameters for identifying “essential” components and created a spreadsheet for evaluating components including.
 - Recommendation (e.g. Assessment, Diagnosis, Intervention, or Outcome from Synthesis)
 - Population (e.g. All patients, Older Adults (Age 65+ years. Patients with risk factors, etc.)
 - Essential Knowledge and Practice Behaviors: Necessary, indispensable, has to be there, foundational) for Staff and for Nurse Leaders
 - Where component is documented (e.g. flow sheet/Patient Education/Care Plan/Medication Administration Record, etc.)
 - How component is entered into the EHR/functionality (e.g. content or clinical decision)
 - Outcome: How would a researcher know the component was completed?
 - Screening decision-support tools -How do a researcher know it was used correctly?
 - Policy or Standard Y/N? – which components have been embedding into policies/standards

Goal #2: Validate that essential KBN electronic content/tools are incorporated in the electronic health record (EHR) and functioning as designed

STATUS: Completed Milestone with additional build to support manual screening 12-DEC-2013

- Utilized findings from Goal #1 as the basis for the gap identification conducted simultaneously during syntheses review of essential knowledge and nursing practice behaviors (preliminary list of gaps identified).
- Submitted specifications (17-Jun-2013) for building the “sidebar report” a print group report that provides nurses with viewable information about patient risk factors for use in matching interventions and patient education. Completed and tested.31-Aug-2013
- Submitted specifications for building manual mechanism for initiating additional screening tools even if they do not trigger based on patient assessment on admission – DEC 2013
- Submitted specifications for daily and monthly electronic report for capturing depressive symptom, cognitive and medication adherence screening on the Key Performance Indicator daily and Monthly reports. NOV-DEC 2013.

Goal #3: Develop reliable and valid measures and measurement processes for evaluating the implementation and adoption of KBN-based practices

STATUS: Completed Milestone DEC-2013

Measure Development (refer to details in Research Accomplishments)

- Nurse Survey The 4 part-Nurse Survey Tool including the Alberta Context Tool
- Nonparticipant Observation Tools
- Audit Tool
- Patient Survey including preliminary medical record review
- Process and Outcome Metrics: Process and outcome metrics were identified in the study protocol and will extracted from existing sources.

#4: Conduct baseline measurement to identify gaps (knowledge, practice behaviors, or EHR build) to improve the integrity of the planned KBN intervention study

Status: Pending

- AHC Biomedical Institutional Review Board (IRB) Study #13-142E approval was received with waiver of documentation of informed consent for nurse subjects, HIPAA authorization for retrospective medical record review, and requirement for maintaining a copy of the patient subject consent in the subject’s medical record.
- DOD/USAMRMC Award #W81XWH-13-1-0034 protocol was submitted for review to the United States Department of Defense Human Research Protection Office (HRPO) in January 2014
- Measures and procedures are in place to start – when final IRB approval is received.
- Brigit Ciccarello, M.A., Regulatory Compliance Specialist, Telemedicine & Advanced Technology Research Center (TATRC) Research Program Officer advised that KBN Team could proceed with the administrative steps for recruiting units and subjects. Data collection would be on hold until HPRO approval was received.
- Recruitment meetings were kicked off at the study site with Nurse Leaders on 7-Jan-2013.
- A recruitment video was created to support a consistent message to all units/nurses
- Recruitment meetings were held with the use of a recruitment video to explain the study
- All 23 Units at ASLMC have agreed to participate in the study 24-February-2014

Goal #5 Design the Intervention Study strategy including the delivery method

Status: In progress

The team is preparing a model and manuscripts as discussed in Research Accomplishments (below)

Goal #6 Carry-out the intervention study at the ASLMC site

Status: Future

Goal #7 Complete tracking process of the intervention

Status: Future

Goal #8 Complete a full evaluation measuring the impacts of KBN methods on patient outcomes

Status: Future

KEY RESEARCH ACCOMPLISHMENTS:

1) Updated Theoretical Frameworks to Guide the Study

The **Knowledge-Based Nursing (KBN) Conceptual model** (Appendix A) describes the process of creating actionable evidence-based practice recommendations and embedding them into the content and CDS tools in the EHR and nursing policy to support the utilization of research-based recommendations in practice with evaluation. The initial deployment of this innovation was focused on designing and embedding the evidence-based recommendations into policy and the EHR with specific training for front-line staff nurses using the standard approach used by the organization. Essential recommendations were reviewed by the System Nursing Practice Council responsible for reviewing the evidence and selectively adopting and writing key recommendations into policy to ensure adoption. The original KBN Conceptual Framework depicted the use of secondary data from the EHR for quality improvement and research, but provided limited direction regarding how to ensure the adoption and use of the evidence-based practices in patient care.

The **KBN Logic Model (Appendix B – updated)** guided the initial conceptualization and included concepts that were believed to influence the adoption and use essential knowledge and practice behaviors by staff nurses and nurse leaders that were not explained in the KBN Conceptual Framework.

The KBN Team attended a conference on implementation science and reviewed the implementation science literature to identify a suitable model. The Team selected the **Dissemination of Evidence-Based Policy framework (Appendix C – add)** by Dodson, Brownson, and Weiss (2012, p. 440) as the theory-based guide for this study. Although the model is conceptualized for public health, the concepts appear to be relevant to the evidence-based policy process used in acute care. Dodson and colleagues (2012) describe three key domains to implement evidence-based practice: policy content, policy process, and policy outcomes. “Policy content” focuses on identifying the specific evidence based policy elements that are likely to be effective. “Policy outcomes” refers to the overall effect of policy implementation. “Policy process” refers to the many factors including the structure and scope of the process, the presence and standing of the policy “sparkplug” (facilitator) and their ability/skills to articulate, advocate, and communicate support for the policy. These authors suggest that intermediaries need clear roles and accountabilities for disseminating the evidence-based intervention. A “**passive**” approach to dissemination involves “innovation development” (based on rationale) and strategies that increase target audience “awareness”. An “**active**” approach involves actively facilitating the adoption, implementation, and maintenance processes. “Adoption” is defined as “a decision to make full use of an innovation as the best course of action available” and to

take steps to identify and address barriers to adoption. “Implementation” refers to ‘the extent to which an innovation is carried out with completeness and fidelity’ with a focus on improving the skills of the adopters through training and technical assistance. “Maintenance” refers to the extent to which an innovation becomes embedded into the normal operation and maintained by policy enforcement (p. 440). This theory supports both hypotheses in this study – that passive dissemination (policy/EHR embedding) can achieve some process outcomes; however, supporting nurse leaders to optimize the implementation using electronic report tools would be useful in providing nurse leaders with an efficient way to oversee adoption and achieve improved outcomes. The model indirectly refers to the use of a “sparkplug” (facilitator) to support the utilization of research/evidence to achieve and maintain/enforce use of the process with context considerations when comparing across populations but no specific facilitators were identified.

The Research Team also reviewed the literature to identify how to measure the concept of “Culture” as specified in the original KBN Logic Model. Implementation science researchers have demonstrated that contextual factors influence the use of research/evidence-based practices and must be assessed and quantified to evaluate the impact of interventions. After significant investigation, the Team selected the **Alberta Context Tool (ACT)** (Estabrooks, 2007; Estabrooks, et al., 2011 – **add**) for use as a measure for the study. The ACT a valid and reliable measure of context in complex health care settings. The developer allows researchers to use the tools by written contract for use with no changes and for sharing the findings. The ACT instrument will be administered to staff nurses, nurse managers, clinical nurse specialists and nurse clinicians. The tool assesses 10 concepts associated with context and has been shown to be a useful measure for detecting contextual variation between units and in response to interventions used to promote research utilization, even after controlling for individual characteristics. “Context” describes the “physical environment in which practice takes place” (Rycroft-Malone, et al, 2002, p. 176). Context describes three primary dimensions: culture, leadership, and evaluation. “Culture” is defined as the ‘the way we do things’ in the organization and on the work unit (Estabrooks, et al. 2011). It captures perceptions about the degree of freedom that respondents have to make important patient care and work decisions. “Leadership” is defined as the actions of formal leaders in an organization (unit) to influence change and excellence in practice. “Evaluation” is defined as the process of using data to assess group/team performance and to achieve outcomes (organization/unit). The ACT has been developed using factor analysis and used as a measure to describe variation in organization context in the 3 primary dimensions of context and 7 others. The ACT subscales are consistent with factors that proposed for measurement in the KBN Logic Model.

Research Utilization: The concept of “research utilization” refers to the active use of evidence-based research. Research utilization often requires facilitation by an individual(s) who is skilled in change management and organizational development and can prepare, guide, support implementation, and remove barriers (Seers, Cox, Crichton, et al., 2012; Dodson, Brownson, & Weiss, 2012). Estabrooks and colleagues (2008) examined determinants of research utilization by nurses in acute care and proposed several additional questions for gathering perceptions about research utilization, authority to use research, attitude toward research, intent [to do research], people support, and organizational support. These questions will be included in the Nurse Survey to capture individual nurse perceptions and current involvement in research and research utilization efforts that may describe nurse and nurse leader ability to engage in research facilitation.

Engaging Patients in Using Evidence-based Recommendations (updated section):

Each KBN-based evidence summary (synthesis) identified specific patient outcomes and evidence-based teaching recommendations that were essential for achieving the patient-centered outcomes. The recommendations guided the development of written patient education materials and electronic content and functionality in the EHR to guide and support the nurse in delivering evidence-based information and action-oriented messages to patients and families. The KBN Logic Model specified the importance of assessing the impact of these nurse delivered messages on patient knowledge and behaviors – knowing that there were not suitable tools for measuring this in acute care.

The Research Team conducted an extensive search of the literature to develop the **Patient Education Survey** tool to evaluate the effectiveness of KBN-based patient education as delivered and documented by the nurse during their hospital stay. Researchers have reported that health outcomes are improved when patient, families, and health care providers are actively engaged in partnerships focused on evidence-based, patient centered care (Agency for Healthcare Research and Quality, 2012; Coulter, 2012; Coulter & Ellins, 2007; Hibbard, et al., 2004; Lorig, et al., 1999). According to the Institute of Medicine (2001), patient centered care ensures that patients' wants, needs, and preferences are respected and that individuals have the education and support they need to make decisions and participate in their own care. Patient engagement is a complex phenomenon consisting of active partnerships (Carmen, et al., 2013) that develop over time (Hook, 2006) with patients who are ready and able to take on the role of managing health and health care. Preferences for control in decision-making appear to influence patient understanding and outcomes (Deen, et al., 2011). Hibbard and colleagues (2004) observed that people who effectively live with chronic health conditions possess a high level of knowledge, skills, and confidence and are "activated" – meaning that they are 'ready and able to take on the role of managing health and health care'. Activation refers to the degree to which an individual is engaged as an active participant in managing their own health (Pelletier & Stichler, 2013). Patient activation appears to involve four stages, starting with a belief that the patient role is important, having knowledge and confidence to take action, actually taking action to maintain or improve health, and staying the course even under stress (Hibbard, et al, 2004, p. 1005). Hibbard and colleagues created a tool (Patient Activation Measure (PAM) to support researchers to evaluate patient activation and test strategies to promote self-management with chronic health conditions over time. Researchers (Deen, et al., 2011) in community settings have shown that the PAM tool, and specifically questions about preferred role in decision-making, can be used to track improvements in activation over time

Despite progress in patient engagement research, to date, there is little research applying the concepts of activation and engagement in the study of patient education during hospitalization. Acute care nurses deliver information about health conditions and risks and encourage patients to participate in their care (Dykes, et al., 2011) but, to date, there are no nurse-sensitive instruments or performance measures to evaluate patient knowledge, understanding, or engagement in care during hospitalization (Pelletier & Stichler, 2013). Patient experience researchers are beginning to uncover issues in how caregivers communicate with patients during hospital transitions. Horwitz and colleagues (2013) identified gaps in patient self-reported understanding of health conditions, symptoms, and instructions when the accuracy of the content was verified (Horwitz, et al. 2013). They reported that patients often reported understanding but their understanding was not accurate when recall was verified. Evidence from reviews suggests that well designed written information may be a useful adjunct to improve health knowledge and recall, especially if personalized (Coulter & Ellins, 2007).

These findings suggest that a new conceptualization was needed for how nurses in acute care interacted with patients and engaged them in their care. In creating the Patient Survey tool, the

Research Team created a model for **how nurses use evidence-based interactions to engage patients (Appendix D)**. The model proposes that nurses gather information about patient (knowing), interacts with them in a meaningful way, delivers evidence-based information that will activate and engage them in their care.

2. Measure Development

The conceptual framework and Logic Model were used over the year to guide systematic investigation and further progress on conceptualization. Refer to Key Research Accomplishment Section for rationale. Tools and procedures were developed and submitted for IRB approval. Tools and data collection processes have been tested to ensure efficient and effective data collection when protocol is approved.

- **Nurse Survey:** This tool is designed to evaluate the nurse/nursing unit concepts in the KBN Logic Model. The survey has four parts including demographics, context (using the Alberta Context Tool, research utilization questions, and essential knowledge tests for Staff Nurses and Nurse Leaders. The team spent considerable time refining the essential knowledge test component of the survey.
Alberta Context Tool – The agreement for using the Alberta Context Tool (ACT) was reviewed by Aurora legal counsel, signed and submitted to the tool developers. The 4 part-Nurse Survey Tool & certificate of completion for participants were reviewed and approved by the AHC IRB. Research Team collaborated with the Aurora Education and Organization Development Department to develop a plan to deliver the tool to nurses using the “Learning Connection” with a link to the electronic survey tool. Electronic survey software (“survey monkey”) will be used to upload the questions for use in delivering the tool with direct data entry into excel. The Research Team conducted pretesting on the Nurse Survey essential knowledge assessment tools to confirm readability and ease of use. Nurse volunteers reported that it took them almost an hour to do the test. The Team is in the process of refining the questions to improve readability and will consider decreasing the number of questions to reduce the time down to a more reasonable frame of 30-45 minutes. A modification will be submitted for the refined tools.
- **Nonparticipant Observation and Audit tools:** Five parts including standard bedside care observation and audit forms, admission observation and audit forms and a form to observe nurse leader and staff nurses during daily patient outcome facilitation team (OFT) rounds and unit huddles. The tools were developed to capture the use of essential practice behaviors by staff nurses and nurse leaders. Multiple revisions. End-end procedures for conducting observations outlining key steps team will follow when conducting audit and observations. To reduce bias, subjects will be randomly selected (with the opportunity to selectively add one patient to the observation list if they have care requirements that are rarely observed (and likely missed during random selection. The observers will be ‘blinded’ – meaning they will observe practice without information about the patient care plan or previous documentation. The Team walked through the audit-observation process end-end with all team members participating in this component of the baseline data collection. The Observation and Audit tools were reviewed and approved by the AHC IRB.
- **Patient Survey:** The Research Team has spent considerable time reviewing the literature and talking with experts at the AMIA conference about regarding patient activation and engagement. We developed and worked on refining a Patient Survey to help us to understand the process and

outcomes associated with delivering evidence-based educational recommendations to patients in acute care. Four patient education experts were asked to review the survey for content/face validity. The experts agreed that 20 of the 24 items were relevant. Three items (one characteristic and two teaching method/collaboration items) received lower ratings by one reviewer.

Survey Question Domain	# Items	Average Score	% Relevant (3-4)
Patient Characteristics	4	3.6	89%
Decision-making Preference	2	4.0	100%
Teaching Method/Communication	8	3.6	100%
Teaching Method/Collaboration	3	2.8	78%
Knowledge and Behavior Outcomes	7	3.9	100%

The Research Team utilized electronic survey software (“survey monkey”) to upload the survey questions for bedside use with direct data entry into excel. We obtained access to Apple iPad hardware for use during on-unit data collection with patients. The Patient Survey was pre-tested with test subject volunteers at an alternate site to ensure that the questions were understood by patients. A ‘showcard’ was developed to assist patients to answer the questions regarding decision-making. The Patient Survey, prescreening form (with HIPAA waiver), and recruitment materials were reviewed and approved by the AHC IRB. In approving the process, the AHC IRB required that the team create a process to allow patients hospitalized on the study units to ‘opt out’ or opt out before being asked to participate by researchers. The Team drafted end-end procedures for conducting the prescreening for patient eligibility, informed consent, and the survey with excel file for tracking patients and patient data.

- **Process and Outcome Metrics:** Process and outcome metrics were identified in the study protocol and will be extracted from existing sources.

REPORTABLE OUTCOMES:

- Measure development and pretesting is complete
- Baseline Data Collection pending (awaiting release from AHC with HRPO approval)
- Manuscripts in progress
 - Revising the KBN Conceptual Framework with a manuscript to discuss the application of the Dissemination of Evidence-based Policy for use in acute care using passive and active dissemination strategies. These concepts are foundational as we proceed to the next phase of our work (Goal #5 Optimization Training/Intervention)
 - Hook & Bauer are working on a manuscript and an abstract for the AMIA fall conference – describing the theoretical basis for the Patient Survey study (refer to Conceptual Framework Appendix D), the development and content/face validity and usability evaluation of the tool.

CONCLUSION:

The “Impact Study” is proceeding with goal accomplishment as planned. The Research Team has completed extensive literature review for building the foundation for the study. The conceptualizations are solidly in place to support the measure development. Manuscripts are in process to define concepts and report measure development. When final human subject approvals are received – we are ready to proceed immediately (**Appendix H. Project Timeline – Year 2-3**)– slightly behind the original plan

but able to make up time with intervention planning already in progress. Our team will continue to work with LTC Ludwig and his team forging relationships as we have more tangible information to share with them.

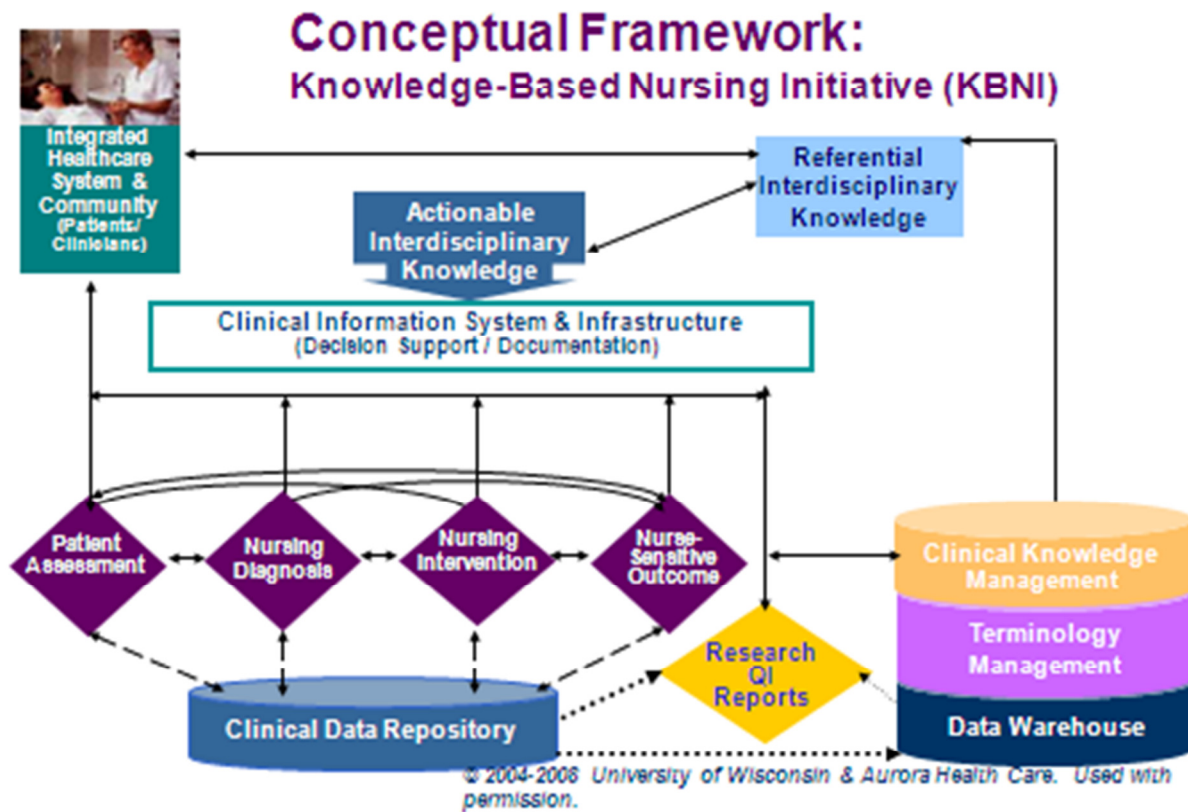
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APPENDIX A. Knowledge-based Nursing Initiative (KBNI) Conceptual Framework
(revision in progress)



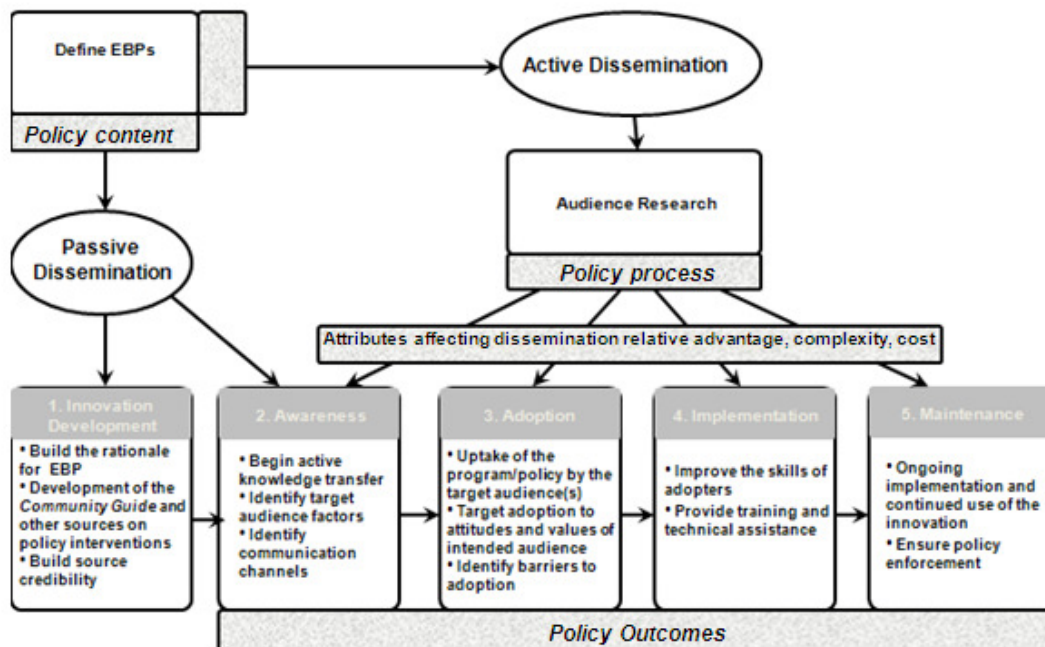
APPENDIX B. Updated Knowledge-based Nursing (KBN) Logic Model

Knowledge-Based Nursing (KBN) Program Logic Model

Inputs		Outputs		Outcomes		
Tools		Activities	Participants	Implementation	Adoption	Outcomes
KBN Conceptual Framework		Aurora System Nursing Culture	Nurse Executives*	Nurse Leader KBN /EBP Knowledge	Nurse Leader Adoption Behavior	Mortality
KBN Syntheses		KBN Built into Policy	Patient Care Managers*	Staff RN KBN/EBP Knowledge	Frontline Staff Adoption Behaviors	Length of Stay
Standardized, nurse-sensitive EHR elements		Shared Governance (System)	Clinical Nurse Specialists	Accurate Risk/Event Screening	Early Detection of Complications	30 Day Readmission
Electronic Functions for Care Planning		Nursing Unit-Level Environment*	RN (Frontline) Staff	Accurate Problem Identification	Care Plan Interaction	Nurse Sensitive Adverse Outcomes *
Clinical Decision Support (CDS) Tools		KBN-specific Training	Providers	KBN-based Technology Used Effectively	Technology Acceptance (Ease/Usefulness)	Nurse-Sensitive Outcomes (Beyond Adverse Events)
Patient Level Evaluation Tools		Unit-Level Adoption Support	Patients	KBN-based Collaboration Knowledge	KBN-based Collaboration Behavior	Provider Satisfaction with Collaboration
Aggregate Level Evaluation Tools					Patients Receive Evidence-based Message	Patient Reported Use of Recommendations
				Nursing-Sensitive Parameters - (Not specifically influenced by KBN Evidence)		
Externally Reported Nursing-Sensitive Measures Fall Eventiv, Fall-related Injuries & Hospital Acquired Pressure Ulcers				Patient Acuity / Turnover	RN Satisfaction*	Patient Satisfaction
				Staffing* (Nursing Care Hours/Ratio/Mix/Education)	RN Turn Over	
Assumptions:				External Factors:		
1. KBN Synthesis are updated when significant evidence is published				1. Units have different physical/unit layouts (e.g. access to medication and computers)		
2. Usual level of leadership and staff turnover				2. Large scale system-wide implementation of new EHR system (complete by 2013)		
3. No significant change in unit layout or care delivery process				3. System Strategic Plan focused on creating accountable care organization		
4. Float pool nurses receive same level as Assigned Nursing Staff				4. External forces disseminating potentially competing work		

APPENDIX C. Dissemination of Evidence-Based Policy Framework
(Dodson, Brownson, & Weiss, 2012, p. 440)

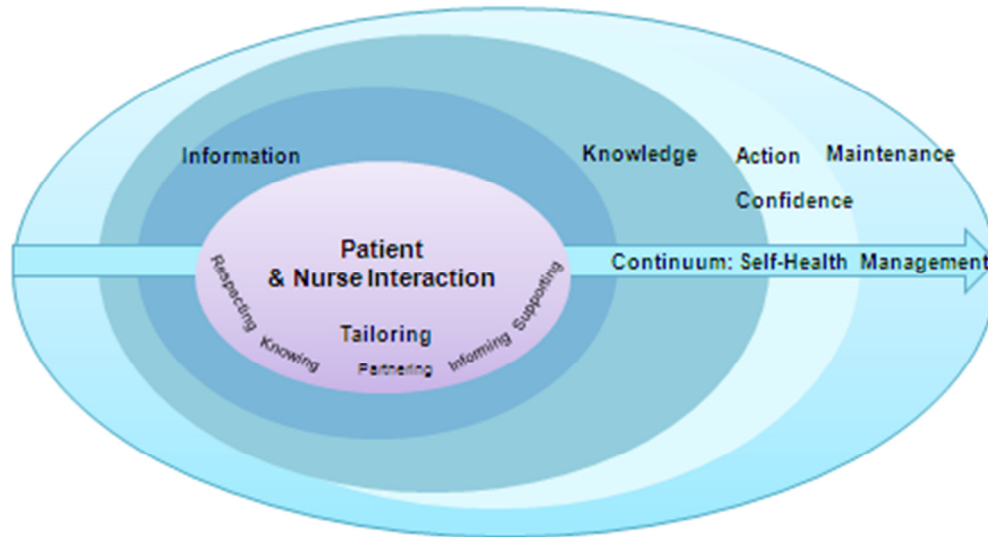
Framework for Dissemination of Evidence-Based Policy



Dodson, Brownson, & Weiss, (2012). *Policy Dissemination Research*, (p. 440)

APPENDIX D. Conceptual Model: Using Evidence-based Interactions to Engage Patients (Draft)

Conceptual Model: Using Evidence-based Interactions to Engage Patients



APPENDIX E. Facility Description: Aurora St. Luke's Medical Center, Milwaukee, WI

Unit	Unit Type	Approximate # of Staff	Associated Units Approximate # Staff	Total Staff in Group	Beds	Avg # IP/mo
Critical Care Units: 5 Units - 374 Staff; 75=Avg Staff /Unit						
NEICU (1L)	Neurosurgical ICU	83	6KLM (31) 10LM (34)	138	16	96
MRICU (8T)	Medical/Respiratory ICU	83	12S (27), 12T (25) 4KLM (39) 4EF (47) 9LM (35)	249	24	114
SICU (3L)	Surgical ICU	42	3CD (31), 3EF (35), 8C (32), 11S (29), 11T (31)	169	14	70
CICU (8S)	Coronary ICU	75	5KLM (30), 10S (30), 10T (33), 11LM (29)	204	24	118
CVICU (7T)	Cardiovascular Surgical ICU	91	9S (42) 9T (42)	195	30	92
Medical/Surgical Units: 18 Units – 600 Staff – 33.4 = Avg Staff/Unit; SD=5.6 Range=25-47)						
11 S	Orthopedics/Surgical	29	SICU		24	150
11T	Orthopedics/Surgical	31	SICU		24	154
12 S	Oncology	27	MRICU		24	103
12T	Oncology	25	MRICU		24	94
3CD	Surgical	31	SICU		23	125
3EF	Surgical	35	SICU		26	134
4EF	Medical/Telemetry	47	MRICU		33	143
4KLM	Medical	39	MRICU		32	139
5KLM	Medical	30	CICU		33	130
6KLM	Surgical Neurology	31	NEICU		32	83
8 Center	Med/Surg Transplant	32	SICU		26	131
9LM	Medical/Telemetry	35	MRICU		23	108
10LM	Medical/Neurology	34	NEICU		29	114
11LM	Medical/Heart Failure	29	CICU		23	104
9S	Cardiac Surgical Step Dn	42	CVICU		24	81
9T	Cardiac Surgical Step Dn	42	CVICU		24	73
10S	Cardiac Procedural	30	CICU		24	91
10T	Cardiac Medical	33	CICU		24	121
Total						2,568

APPENDIX F: Federal Military Advisory Charter

Federal Military Advisory Group Charter Working Draft – 9/26/13

A. Purpose of the Federal Advisory Group:

- Establish a representative network of military/VHA nursing/informatics advisors to facilitate ongoing dialogue with KBN Research Team about how professional nursing, evidence, and informatics are used to support/enhance patient care.
- Create a framework for gather information from each branch of the Advisory Committee (Army, Navy, Air Force, and VHA) about how they integrate evidence into clinical and informatics-based processes. (Compare finding with the model used by Aurora Health Care)
- Share findings from baseline assessment (above) and foster open dialogue with Representatives and Research Team members regarding similarities and differences in the civilian and military health care settings
- Use findings/advisor input to guide research team in conducting study and writing up the results that facilitates application across the civilian and military health care environments.
- Identify structure and process for application of TATRC funded research in Military setting

B. Alignment

- KBN team is aligned with informatics department and nursing leadership and shared governance at Aurora
- Participating federal members have diverse roles within the Military with opportunities to link out to key nursing and informatics leaders throughout the military and veteran system and can reach out to key people if/when needed

C. Group Membership and Composition

Size: # of members (TBD) - Small group with linkages as needed.

Composition/skill set of members include but not limited to:

- Members represent VA/DoD Nursing Informatics Collaborative Group members
- Representation from system level nursing leaders, nursing informatics leaders and operations staff, site and unit level nurse leaders (e.g. directors, patient care managers, mid-level managers), and individuals who oversee nursing quality metrics. [Federal Team members could provide a written summary of the infrastructure between nursing and informatics in the military for KBN Team to get a feel for diversity]

D. Role and Responsibilities of Group Members

Role of Group Moderators/Owners (Advisory)

Name	Role	Area/Agency/ Location
• LTC Michael Ludwig	CNIO	Army Medicine
• Daniel Marsh	Nursing Informatics Specialist	Veterans Administration
• Maj. Benjamin (Eli) Seeley	CMIO	NNMC
• Lt Elizabeth Fleischer		Public Health
• Capt Veronica Gordon		Public Health & National Program Office
• Murielle Beene	CNIO	Veterans Health Administration
• Ollie Gray– Health I	TATRC Research Project Manager	Fort Detrick - Maryland
• Toni Phillips	Nursing Informatics Specialist	Veterans Administration
• Lynn Shuler	Nursing Informatics Specialist	Veterans Administration
• CAPT Joel Parker		Navy Representative

E. Deliverables

(Products the Group is tasked to produce)

Deliverables: Participation, support, input, and feedback

- Create/utilize a framework for gathering information from Army/Navy/Air Force and VHA regarding structures/processes for implementing Evidence-based Practice/Practice Guidelines into practice (using governance and/or electronic processes:
- Analyze findings to identify similarities and differences between Federal/Military and civilian nursing environment to inform future phases of the KBN Impact study
- Discussions about best practices, evidence-based practices and the use of tools to get value out of HER
- Assist with organizing and conducting site visits with research team (investigate options with no commitment at this time)

F. Meetings and Communication

Meeting Schedule and Process - TBD

-e.g. how often to meet and how to meet; utilize web-based collaboration platform

- Telephonic or web-based baseline meetings, then quarterly meetings going forward
- Site visits – no commitments to date

G. Authority/Limitations (Deferred)

H. Charter Effective Date and Duration

- Effective for 3-year study (with opportunity for annual review/revision)

I. Approval (Deferred)

APPENDIX G: Federal Military Advisory Council – Assessment Form

Research: The Impact of Patient-Centered Electronic Knowledge-Based Nursing Content and Decision-Support on Nurse-Sensitive Patient Outcomes Military Process Assessment Form (Similarities and Differences)

Overview: Aurora Health Care (AHC -an integrated civilian health care system in the Midwest) was funded by Telemedicine and Advanced Technology Research Center (TATRC). The aim of the research is to evaluate the impact of electronic evidence-based nursing practices on patient outcomes and includes the engagement of a “Military Advisory Council” to help us to conduct research that has relevance and applicability at the conclusion of the study.

The Federal Military Advisory Council has asked the Research Team to create a framework to gather information about the Military and VA system related to adoption of evidence-based practices for nurses in acute care. The framework will help us to conduct a “gap analysis” with each branch of the military to identify similarities and differences. We are asking you to identify a few key nurses/nurse leader “informants” in your branch who would be most appropriate to provide summative responses to the questions (below). The questions are designed to gather “current state” of evidence-based practice in nursing, from development of clinical protocols and evidence-based policies to adoption and spread.

NOTE: This survey is voluntary, information sharing, and not part of the formal study.

Branch: ___Army ___Navy ___Air Force ___Veterans Administration

Self-Assessment Questions: Please record brief answers to describe your Branch (overview)
Your responses will be used to guide discussion during Research Team Conference Call.

1. What is the organizational structure for nursing within your branch?
Consider attaching an organizational chart and a brief overview re: decision-making for the department/discipline of nursing. We are particularly looking for how staff nurses are involved in decision-making (Example: AHC has 15 hospitals; Elected Staff Nurse Leaders lead the System-wide Shared Governance; Integration is expected across all sites).
2. To what extent is your nursing department committed to the use of evidence-based practice?
(Describe if part of your strategic work, where, who are your champions)
3. What processes does your organization have in place / utilize to form nursing clinical practice guidelines?
4. How do you do translate evidence-based practice recommendations into actual practice? Please speak to the role of nurses/other participants, policies, governance systems, training, or other activities in translating clinical practice guidelines/evidence-based practice (EBP) into direct patient care.
5. Describe some of the ways that you are currently leveraging electronic health record (EHR) functionality to support you in promoting EBP in direct patient care?

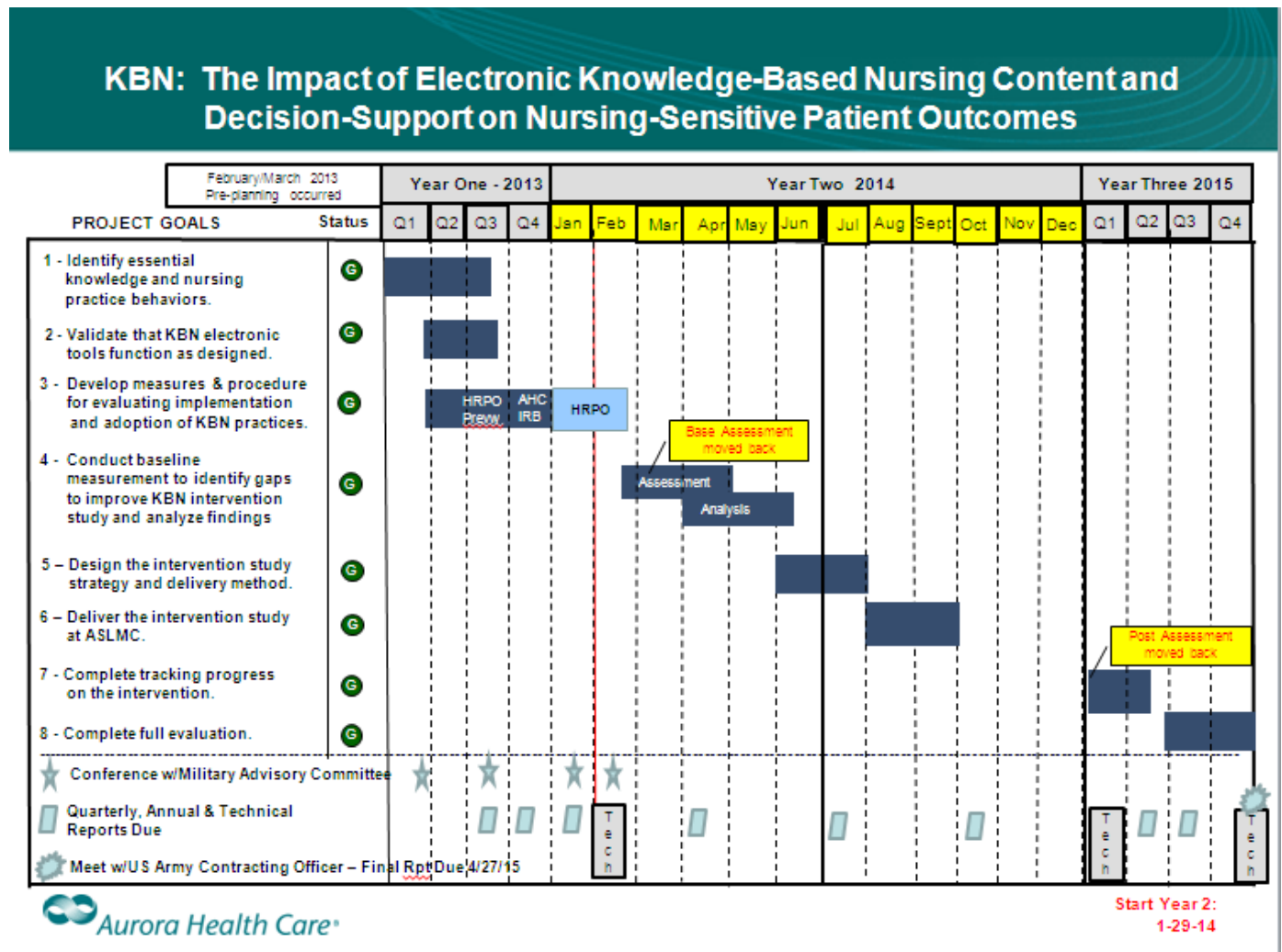
For Questions: Contact Mary Hook, PhD, RN, mary.hook@aurora.org Call (414)647-3251
Aurora Health Care Knowledge-Based Nursing (KBN) Department

6. Describe your clinical/electronic processes that you use to monitor staff adherence for the use of EBP at the point of care?
7. Do your nursing leaders use any specific nurse-sensitive indicators to monitor quality? (Describe measures used at the Branch, hospital- and unit-level metrics)
8. The Knowledge-Based Nursing Research study is focused on 6 key patient problems in the acute care setting including pain, medication adherence, depressive symptoms, risks for falls/fall related injury, pressure ulcers, and delirium. Use the table below to briefly indicate if you have specific initiatives or efforts involving these topics.

Topics	Initiatives
Pain	
Risk for Falls/Fall-related Injury	
Pressure Ulcer Prevention and Management	
Delirium Prevention/Management	
Medication Nonadherence	
Depressive Symptoms/Suicide	

For Questions: Contact Mary Hook, PhD, RN, mary.hook@aurora.org Call (414)647-3251
Aurora Health Care Knowledge-Based Nursing (KBN) Department

APPENDIX H: KBN Impact Study – Projected Timeline Years 2-3



APPENDIX I: Southeastern WI “Bridges” to Research Conference 2014 Call for Abstracts



16th Annual Southeastern Wisconsin Nursing Research Conference*

May 9, 2014, Marquette University, Milwaukee, WI

Call for Oral and Poster Presentation Abstracts

Abstracts due December 6, 2013

ABSTRACT GUIDELINES

1. One page, 8 1/2" by 11", single spaced, using Arial, font size 11, with margins of 1 1/2" on the left and 1" margins on all of the other sides.
2. Page heading to include: Title of the oral presentation or poster in CAPITAL LETTERS, the authors' names, credentials, organization affiliation, city; phone number and e-mail of 1st author.
3. Under the heading, identify submission for oral or poster presentation. Research or projects presented orally must be completed by the conference date, preliminary or to-date findings accepted for posters.
4. Abstracts must include the following:
 - Background / Significance
 - Purpose of the study/project
 - Conceptual framework, if applicable
 - Sample Description/Population
 - Setting
 - Method/Design & Procedure
 - Results/Outcomes
 - Conclusions/Implications
5. Submit the abstract via e-mail no later than December 6, 2013 to:

Sarah Morgan smorgan@uwm.edu

THANK YOU FOR YOUR ABSTRACT SUBMISSION

*Co-sponsored by Southeast Wisconsin Research Consortium Members: Alverno College, Aurora Health Care, Children's Hospital & Health System, Columbia St. Mary's, Community Memorial Hospital, Concordia University Wisconsin, Froedtert Hospital, Marquette University, ProHealth Care, Sigma Theta Tau Chapters: Delta Gamma at Large, Eta Nu, and Phi Beta; University of Wisconsin-Milwaukee, Wheaton Franciscan Healthcare, and Clement J. Zablocki VA Medical Center

APPENDIX J. “Bridges” 2014 Conference Abstract Submission – Poster in progress

MEASURING THE IMPACT OF EVIDENCE-BASED PATIENT EDUCATION ON PATIENT
KNOWLEDGE AND BEHAVIOR IN ACUTE CARE

Wendy S. Bauer, BSN, RN and Mary L. Hook, PhD, BC-RN
Aurora Health Care, Milwaukee (414) 647-6462 wendy.bauer@aurora.org

Background: Informing, activating, and engaging patients through the use of tailored, patient-centered educational interventions have been shown to positively impact the self-management of chronic conditions. Despite progress in patient engagement research, little is known about activating and engaging patients in care during hospitalization. Delivering information and encouraging patients to participate in their care is an essential aspect of nursing care. However, no instruments exist to measure the process and impact of nurse-based educational interventions on patient knowledge, patient adoption of evidence-based recommendations, and care outcomes.

Purpose: To design and conduct preliminary evaluation of a survey developed to gather patient perceptions and outcomes associated with nurse-delivered educational interventions in acute care. Preliminary testing was focused on validity evaluation with patient education experts and usability pretesting with patients.

Sample/Setting: Validity evaluation was conducted at a large, quaternary medical center with experts (n=4) actively involved in developing, delivering, or researching patient education. Usability pretesting was conducted with a convenience sample of medical patients (n=3) hospitalized at the medical center.

Method: A 23-item survey tool was developed to assess patient characteristics, preferences for decision-making, perceptions about teaching methods, communication and collaboration, and patient-reported knowledge and behavior outcomes. Study aims and survey content was reviewed. Three of the four experts completed a content validity evaluation (1-4 scale) of the relevance of the survey. Feedback about the process and clarity of the proposed survey was gathered at the bedside from patient volunteers.

Results: Experts agreed that 20 items were relevant. Three items (one characteristic and two teaching method/collaboration items) received lower ratings by one reviewer.

Survey Question Domain	# Items	Average Score	% Relevant (3-4)
Patient Characteristics	4	3.6	89%
Decision-making Preference	2	4.0	100%
Teaching Method/Communication	8	3.6	100%
Teaching Method/Collaboration	3	2.8	78%
Knowledge and Behavior Outcomes	7	3.9	100%

Patient volunteers answered all survey questions without difficulty within 15 minutes. Revisions in item wording and question sequence were recommended to address relevance issues and enhance readability and survey flow based on feedback.

Conclusion: Preliminary content validation indicates the Patient Education Survey contains relevant and appropriate questions for gathering patient perceptions about the process and outcomes of patient-centered educational interventions. Revisions suggested by experts and patients will be made prior to use in research.

